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FACSIMILE COVER SHEET

TO: EXAMINER: SUDHANSHU C. PATHAK (ART UNIT 2634)

CLIENT NUMBER: 98CT256(53253)

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FROM: PAUL J. DITMYER, ESQ.

DATE: December 29, 2005

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COMMENTS/INSTRUCTIONS:

Please see attached Appeal Brief for Application Serial No. 09/747,786.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF APPEALS

In re Patent Application of: **BERNARDO ET AL.**	Examiner: **S. C. PATHAK**
Serial No. **09/747,786**	Art Unit: **2634**
Confirmation No: **7621**	
Filing Date: **DECEMBER 22, 2000**	
For: **ROBUST COMMUNICATION SYSTEM FOR TRANSMISSIONS IN A NOISY ENVIRONMENT**	

APPELLANTS' BRIEF

MS Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith is Appellant's Appeal Brief together with the requisite $500.00 large entity fee for filing a brief. If any additional extension and/or fee is required, authorization is given to charge Deposit Account No. **01-0484.**

(1) Real Party in Interest

The real party in interest is STMicroelectronics S.r.l., assignee of the present application as recorded at reel 11859, frame 909.

(2) Related Appeals and Interferences

At present there are no related appeals or interferences.

(3) Status of the Claims

Claims 1-8 are canceled, and Claims 9-32 are pending in the application, all of which being appealed herein.

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(4) Status of the Amendments

All amendments have been entered and there are no further pending amendments. A copy of the claims involved in this appeal is attached hereto as Appendix A.

(5) Summary of the Claimed Subject Matter

The invention provides a robust communication system and method for transmissions through a noisy medium. The communication system has structural and functional features useful in spread-spectrum modulation, but is based on a chaotic carrier. The spread-spectrum communication system is based on modulating the chaotic carrier and on the use of an incoherent discriminator for robust transmissions through the noisy medium. Referring to FIGs. 2, 6 and 7, for example, and page 8, line 5 through page 10, line 15, the invention defined by each of the independent claims involved in this appeal will be explained.

Independent Claim 9 is directed to a communication system 1 comprising a transmission channel 4, a signal source 2 for providing a discrete signal, and a chaotic modulator 3 for modulating the discrete signal for transmitting over the transmission channel. An incoherent discriminator 5 receives the modulated discrete signal from the transmission channel. Independent method Claim 25 is similar to independent device Claim 9, and is directed to a method for transmitting a signal over a transmission channel 4 as discussed above.

Independent Claim 17 is directed to a communication system 1 comprising a digital signal source 2 for providing a digital signal, a chaotic modulator 3 for modulating the digital signal for transmitting over a transmission channel 4, and an incoherent discriminator 5 for receiving the modulated digital signal from the transmission channel. The incoherent discriminator 5 comprises a high-pass filter 6, a rectifier 7

connected to an output of the high-pass filter, and a low-pass filter 8 connected to an output of the rectifier.

Independent Claim 21 is directed to a communication system 1 comprising a digital signal source 2 for providing a digital signal, a chaotic modulator 3 for modulating the digital signal for transmitting over a transmission channel 4, and an incoherent discriminator 5 for receiving the modulated digital signal. The incoherent discriminator 5 comprises a low-pass filter 8, a null-threshold comparator 9 connected to an output of the low-pass filter for providing a square-wave output signal, and a divider 10 connected an output of the comparator for scaling the square-wave output signal.

The use of an incoherent discriminator 5 in accordance with the present invention advantageously allows the discrete signal to be reconstructed using a structure that is different than the structure used to modulate the discrete signal for transmitting over the transmission channel 4.

(6) Grounds of Rejection to be Reviewed On Appeal

Claims 9-32 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarbanel et al. (U.S. Patent No. 5,923,760) in various combinations with non-patent citation J. Lee et al. (Secure Communication Using chaos, IEEE Global Telecommunications Conference), Cutler et al. (U.S. Patent No. 5,847,960), Applicants' background discussion, Giacomini (U.S. Patent No. 6,016,078) and/or Brenman et al. (U.S. Patent No. 4,590,942).

More specifically, Claims 9, 12, 25 and 28 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarbanel et al. in view of Lee et al.

Claims 10, 11, 17-19, 26 and 27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarbanel et al. in combination with Lee et al. and Cutler et al.

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Claims 13 and 29 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarbanel et al. in combination with Lee et al., and Applicants' background discussion.

Claims 14, 16, 21, 24 30 and 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarbanel et al. in combination with Lee et al., Cutler et al., Giacomini and Brenman et al.

Claims 15, 22, 23 and 31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarbanel et al. in combination with Lee et al., Cutler et al., Giacomini, Brenman et al. and Applicants' background discussion.

Claim 20 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Abarbanel et al. in combination with Lee et al., Cutler et al. and Applicants' background discussion.

(7) Argument

As will be described in greater detail below, Appellant respectfully submits that there is no proper motivation or suggestion to combine the prior art as proposed by the Examiner. Indeed, there can be no motivation or suggestion to combine the references as the Examiner proposes, as the prior art, taken as whole, teaches away from making such a selective combination of references.

Independent Claims 9 and 25 are patentable over Abarbanel et al. in view of Lee et al.

Claims 9 and 25 were rejected in view of Abarbanel et al. in combination with Lee et al. for the reasons set forth on pages 2 and 3 of the Office Action. Appellants contend that Claims 9 and 25 clearly define over the cited references, and in view of the following remarks, reversal of

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the rejections under 35 U.S.C. §103 is requested.

As discussed, the communication system and method in accordance with the present invention advantageously operates in a noisy medium based upon a chaotic carrier. The use of an incoherent discriminator in accordance with the present invention advantageously allows the discrete signal to be reconstructed using a structure that is different than the structure used to modulate the discrete signal for transmitting over the transmission channel.

The combinations of claimed features are not fairly taught or suggested in the cited references and patentably define over the cited references.

The Abarbanel et al. patent discloses a communication system in which a chaotically generated signal is modulated using a transmitter chaotic signal generator 20 (for example, as shown in FIG. 1 of Abarbanel et al. reproduced below for convenience). After transmission, the received signal is applied to a receiver chaotic signal generator 30, and the chaotic signal is recovered. The chaotic signal is used to demodulate the received signal for recovery of information.

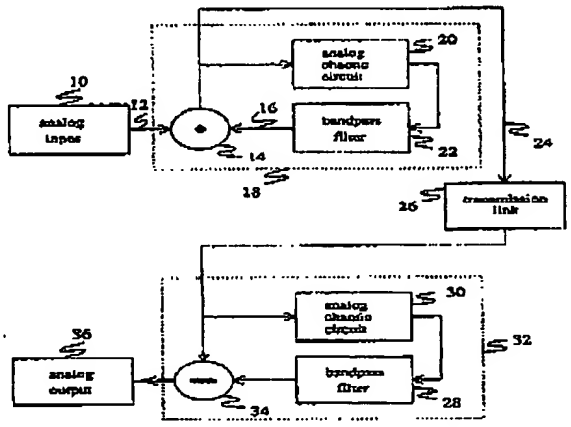

Figure 1 of Abarbanel et al.

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As discussed, for example, in column 4, lines 35-47, column 5, lines 10-12, and column 5, lines 53-65 of Abarbanel et al., the transmitter chaotic signal generator **20** and the receiver chaotic signal generator **30** are identical, and thus achieve auto-synchronization of the chaotic oscillations.

As correctly acknowledged by the Examiner, the Abarbanel et al. system does not include an incoherent discriminator as claimed. However, The Examiner has relied upon the Lee reference as allegedly teaching the use of an incoherent receiver in a chaotic communication system. The Examiner has characterized the power level comparison of the dynamic error of the data streams in Lee as meeting the feature of an incoherent receiver. Furthermore, the Examiner asserts that it would then be obvious to combine such a feature of Lee with the system of Abarbanel et al. to arrive at the claimed invention. However, the combination of references fails to produce the claimed invention, and the Examiner is using impermissible hindsight reconstruction to selectively combine the disjointed prior art references in an attempt to produce the claimed invention in a manner that is not fairly taught or suggested by the prior art.

Indeed, Abarbanel et al. does not include or need an incoherent discriminator for receiving the modulated digital signal from the transmission channel because the chaotic modulator in the transmitter is substantially identical to the corresponding demodulator in the receiver. In other words, the system of Abarbanel et al. teaches away from the use of an incoherent discriminator for receiving the modulated signal from the transmission channel.

The Lee et al. article discloses a secure communication system using a chaotic system. The secure communication system in Lee et al. does not require synchronization of the receiver to the transmitter because the

power level of the dynamic error of each data stream is compared. Nothing in Lee suggests the desirability of using an incoherent discriminator in an auto-synchronizing mirrored system as in Abarbanel et al. Indeed, as set forth in section 1 and section 4 of the Lee article, the authors are concerned with synchronizing two "arbitrary" or "different" chaotic systems.

As the Examiner and Board are aware, to establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify the reference. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim features. The initial burden is on the Examiner to provide some suggestion of the desirability of doing what the Applicants have done. To support the conclusion that the claimed invention is directed to obvious subject matter, either the reference must expressly or impliedly suggest the claimed invention or the Examiner must present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the reference. Both the suggestion to make the claimed combination and the reasonable expectation of success must be founded in the prior art and not in Applicants' disclosure.

There is simply no teaching or suggestion in the cited references to provide the combination of features as claimed. Accordingly, for at least the reasons given above, Applicants maintain that the cited references do not disclose or fairly suggest the invention as set forth in Claims 9 and 25. Furthermore, no proper modification of the teachings of these references could result in the invention as claimed.

Thus, the rejections under 35 U.S.C. §103(a) should be reversed.

It is submitted that the independent Claims 9 and 25 are patentable over the prior art. In view of the patentability of the independent claims, it is submitted that their dependent claims, which recite yet further distinguishing features are also patentable over the cited references for at least the reasons set forth above. Accordingly, these dependent claims require no further discussion herein.

Independent Claims 17 and 21 are patentable over Abarbanel et al. in combination with Lee et al. and Cutler et al., or in further combination with Giacomini and Brenman et al.

The arguments set forth above with respect to the combination of Abarbanel et al. with Lee et al. are repeated here. Furthermore, the Examiner cited Culter et al. as disclosing a low-pass filter, Giacomini as disclosing a null-threshold comparator, and Brenman et al. as disclosing a divider. The Cutler et al. patent is directed to a multi-tool positioning system, the Giacomini patent is directed to differential amplifiers, and the Brenman et al. patent is directed to inhibiting nasal secretions. As such, none of the references is directed to chaotic communication systems at all, and certainly none of these references teaches anything about an incoherent discriminator. Indeed, the Examiner's reliance upon these references is further evidence of the impermissible hindsight reasoning used by the Examiner to combine disjoint pieces of the prior art in an attempt to construct the claimed invention. It is clear that the Examiner used the present invention as a roadmap to create such a hypothetical combination. Moreover, none of these references makes up for the deficiencies of Abarbanel et al. and Lee

references as discussed above.

There is simply no teaching or suggestion in the cited references to provide the combination of features as claimed. Accordingly, for at least the reasons given above, Appellants maintain that the cited references do not disclose or fairly suggest the invention as set forth in Claims 17 and 21. Furthermore, no proper modification of the teachings of these references could result in the invention as claimed. Thus, the rejections under 35 U.S.C. §103(a) should be reversed.

It is submitted that the independent Claims 17 and 21 are patentable over the prior art. In view of the patentability of the independent claims, it is submitted that their dependent claims, which recite yet further distinguishing features are also patentable over the cited references for at least the reasons set forth above. Accordingly, these dependent claims require no further discussion herein.

CONCLUSIONS

In view of the foregoing arguments, it is submitted that all of the claims are patentable over the prior art. Accordingly, the Board of Patent Appeals and Interferences is respectfully requested to reverse the earlier unfavorable decision by the Examiner.

Respectfully submitted,

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I HEREBY CERTIFY that the foregoing correspondence has been forwarded via facsimile number 571-273-8300 to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 this 29 day of December, 2005.

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APPENDIX A - CLAIMS ON APPEAL FOR U.S. PATENT APPLICATION SERIAL NO. 09/747,786

9. A communication system comprising:

a transmission channel;

a signal source for providing a discrete signal;

a chaotic modulator for modulating the discrete signal for transmitting over said transmission channel; and

an incoherent discriminator for receiving the modulated discrete signal from said transmission channel.

10. A communication system according to Claim 9, wherein said incoherent discriminator comprises:

a high-pass filter;

a rectifier connected to an output of said high-pass filter; and

a low-pass filter connected to an output of said rectifier.

11. A communication system according to Claim 10, wherein said incoherent discriminator further comprises a comparator connected to an output of said low-pass filter.

12. A communication system according to Claim 9, wherein said incoherent discriminator is self-synchronizing.

13. A communication system according to Claim 9, wherein said signal source generates a low logic value signal having associated therewith a chaotic evolution corresponding to a complete Chua's attractor.

14. A communication system according to Claim 9,

wherein said incoherent discriminator comprises:

a low-pass filter;

a null-threshold comparator connected to an output of said low-pass filter for providing a square-wave output signal; and

a divider connected an output of said comparator for scaling the square-wave output signal.

15. A communication system according to Claim 14, wherein said signal source generates a low logic value signal that is associated with a chaotic dynamics corresponding to a left-hand lobe of a Chua's attractor.

16. A communication system according to Claim 14, wherein said low-pass filter is a fourth order filter.

17. A communication system comprising:

a digital signal source for providing a digital signal;

a chaotic modulator for modulating the digital signal for transmitting over a transmission channel; and

an incoherent discriminator for receiving the modulated digital signal from the transmission channel, said incoherent discriminator comprising

a high-pass filter,

a rectifier connected to an output of said high-pass filter, and

a low-pass filter connected to an output of said rectifier.

18. A communication system according to Claim 17, wherein said incoherent discriminator further comprises a comparator connected to an output of said low-pass filter.

19. A communication system according to Claim 17, wherein said incoherent discriminator is self-synchronizing.

20. A communication system according to Claim 17, wherein said digital signal source generates a low logic value signal having associated therewith a chaotic evolution corresponding to a complete Chua's attractor.

21. A communication system comprising:

a digital signal source for providing a digital signal;

a chaotic modulator for modulating the digital signal for transmitting over a transmission channel; and

an incoherent discriminator for receiving the modulated digital signal, said incoherent discriminator comprising

a low-pass filter,

a null-threshold comparator connected to an output of said low-pass filter for providing a square-wave output signal, and

a divider connected an output of said comparator for scaling the square-wave output signal.

22. A communication system according to Claim 21, wherein said digital signal source generates a low logic value signal having associated therewith a chaotic evolution corresponding to a complete Chua's attractor.

23. A communication system according to Claim 21, wherein said digital signal source generates a low logic value that is associated with a chaotic dynamics corresponding to a

left-hand lobe of a Chua's attractor.

24. A communication system according to Claim 21, wherein said low-pass filter is a fourth order filter.

25. A method for transmitting a signal over a transmission channel, the method comprising:

generating a discrete signal;

modulating the discrete signal using a chaotic modulator for transmitting over the transmission channel; and

receiving the modulated discrete signal from the transmission channel using an incoherent discriminator.

26. A method according to Claim 25, wherein receiving the modulated discrete signal comprises:

filtering the modulated discrete signal using a high-pass filter;

rectifying the filtered signal from the high-pass filter; and

filtering the rectified signal from the high-pass filter using a low-pass filter.

27. A method according to Claim 26, further comprising using a comparator for a generating square wave signal from the filtered signal provided by the low-pass filer.

28. A method according to Claim 25, wherein the incoherent discriminator is self-synchronizing.

29. A method according to Claim 25, wherein a signal source generates a low logic value signal that is associated with a chaotic dynamics corresponding to a left-

hand lobe of a Chua's attractor.

30. A method according to Claim 25, further comprising:

filtering the modulated signal using a low-pass filter;

providing a square-wave output signal using a null-threshold comparator connected to an output of the low-pass filter; and

scaling the square-wave output signal using a divider connected an output of the comparator.

31. A method according to Claim 30, wherein the signal source generates a low logic value that is associated with a chaotic dynamics corresponding to a left-hand lobe of a Chua's attractor.

32. A method according to Claim 25, wherein the low-pass filter is a fourth order filter.

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Evidence Appendix

None

Related Proceedings Appendix

None

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